oven (air 75° C.) for 30 min producing a rubber foam material with $CaCO_3$ and Mg particles distributed throughout the polymer network. The sample was ground in a blender until a particle size of about 2 mm or less was achieved. About 50.5 g of the $CaCO_3$/Mg/siloxane foam particles were stirred into a 500 ml plastic beaker containing a mixture of polymethylhydrosiloxane-polydimethylsiloxane copolymer (Gelest, HMS-151, 35.0 g), hydroxy terminated polydimethylsiloxane (Gelest, DMS-S27, 35.3 g), Mg metal powder (Alfa/AESAR, −325 mesh, 20.0 g), and Ni metal powder (ROC/RIC, −325 mesh, 35.0 g). The resulting mixture was heated in an oven (air) at 50° C. for approximately 2 hr, followed by addition of stannous octoate in polydimethyl siloxane (General Electric, 1.1 g) with stirring, and additional heating at 50° C. for 1 hr.

A machined disk of the polysiloxane/Mg/$CaCO_3$/Mg/Mg-Ni sample was heated in a 5% hydrogen/95% argon atmosphere (2 l/min) at 2° C./min to 1000 ° C. and held at that temperature for 2 hr. X-ray microfluorescence confirmed areas of high Ca with no Ni present and regions of high Ni with no Ca present, both consistent with the size and mixing methodology. Mg present as MgO was shown to be dispersed throughout the sample.

We claim:

1. A method for preparing a porous sintered body, comprising the steps of:

a) dispersing at least one powdered material into a liquid mixture of a hydroxide functional siloxane and a hydride functional siloxane to form a uniform liquid suspension, wherein said powdered material is selected from the group comprising metals, ceramics, metal salts, and combinations thereof, said hydroxide functional siloxane and said hydride functional siloxane selected to form a crosslinked siloxane polymer in the presence of a polymerization catalyst such that said polymer thermally decomposes to leave zero char yield when heated to a temperature above about 600° C.;

b) mixing said uniform liquid suspension together with said polymerization catalyst, said catalyst causing said siloxane mixture to initiate a crosslinking reaction while simultaneously liberating hydrogen gas, said gas causing said liquid suspension to foam, said crosslinking reaction forming a solid polymer body, wherein said solid polymer body is a foam structure having the powdered material uniformly dispersed therein; and

c) heating the solid polymer body in a reducing atmosphere above 600° C. to form said porous sintered body.

2. The method of claim **1**, wherein the hydroxide and the hydride functional siloxane are combined in a ratio of about 1:1 by weight.

3. The method of claim **1**, wherein the particle size of the powdered material is less than about 400 μm.

4. The method of claim **3**, wherein the powdered material is a ceramic powder selected from the group consisting of metal oxides, carbides, borides, nitrides, silicides, aluminas, mullites, zeolites, and combinations thereof.

5. The method of claim **3**, wherein the powdered material is a metal salt selected from the group consisting of carbonates and nitrates.

6. The method of claim **2**, wherein the hydroxide and hydride functional siloxanes consist essentially of hydroxyl terminated polydimethylsiloxane and polymethylhydrosiloxane-polydimethylsiloxane copolymer.

7. The method of claim **1**, wherein the step of foaming further includes the step of adjusting the temperature of the suspension to control the rate of foam formation.

8. The method of claim **1**, wherein the step of dispersing further includes the step of adding a diluent to change the viscosity of the mixture.

9. The method of claim **1**, wherein the step of dispersing includes adding a sintering aid to the siloxane mixture.

10. The method of claim **1**, wherein the reducing atmosphere is 5 vol % hydrogen in argon.

11. The method of claim **1**, wherein said step of dispersing further includes dispersing a material produced by reducing the product of step b) to a powder.

12. A porous foam produced by the method of claim **1**, wherein said powdered material is a metal selected from the group consisting of aluminum or magnesium, said metal having a particle size of less than about 400 μm, and wherein further said porous foam has a BET surface area of at least about 3 m^2/g.

13. A method for preparing catalysts and supported catalysts, comprising the steps of:

a) dispersing at least one powdered material into a liquid mixture of a hydroxide functional siloxane and a hydride functional siloxane to form a uniform liquid suspension, wherein said powdered material is selected from the group comprising metals, ceramics, metal salts, and combinations thereof, said hydroxide functional siloxane and said hydride functional siloxane selected to form a crosslinked siloxane polymer in the presence of a polymerization catalyst such that said polymer thermally decomposes to leave zero char yield when heated to a temperature above about 600° C.;

b) mixing said uniform liquid suspension together with said polymerization catalyst, said catalyst causing said siloxane mixture to initiate a crosslinking reaction while simultaneously liberating hydrogen gas, said gas causing said liquid suspension to foam, said crosslinking reaction forming a solid polymer body, wherein said solid polymer body is a foam structure having the powdered material uniformly dispersed therein;

c) committing the solid polymer body to form a loaded polymer powder;

d) repeating step a), wherein the powdered material is the loaded polymer powder;

e) repeating step b) thereby forming a second solid polymer body; and

f) heating the second solid polymer body in a reducing atmosphere at a temperature above 600° C. to form a multicomponent porous sintered body.

14. The method of claim **13**, wherein the reducing atmosphere is 5 vol % hydrogen in argon.

15. The method of claim **13**, wherein the hydroxide and the hydride functional siloxane are combined in a ratio of about 1:1 by weight.

16. The method of claim **13**, wherein the particle size of the powdered material is less than about 400 μm.

17. The method of claim **17**, wherein the powdered material is a ceramic powder selected from the group consisting of metal oxides, carbines, borides, nitrides, silicides, aluminas, mullites, zeolites, and combinations thereof.

18. The method of claim **16**, wherein the powdered material is a metal salt selected from the group consisting of carbonates and nitrates.

19. The method of claim **15**, wherein the hydroxide and hydride functional siloxanes consist essentially of hydroxyl terminated polydimethylsiloxane and polymethylhydrosiloxane-polydimethylsiloxane copolymer.

20. The method of claim **13**, wherein the step of foaming further includes the step of adjusting the temperature of the suspension to control the rate of foam formation.